a fortnight is virtually to diminish by one-third the number of beds set apart for the disease, and adds to the cost of the maintenance of the patients.—I am, etc.,

Hemingford Abbots, Huntsmen, Jan. 15th. E. W. GOODALL.

FATALITY RATES OF SMALL-POX IN THE VACCINATED AND UNVACCINATED.

SIR,—In the JOURNAL of January 14th (p. 74) Dr. R. P. Garrow draws attention to the fact that the fatality rate among the vaccinated cases of small-pox occurring in England and Wales in the years 1923 to 1926 at ages over 15 was apparently higher than among the unvaccinated cases, and he asks for a possible explanation. The explanation can be found in (1) the widely different age distributions of the groups compared, and (2) the smallness of the actual numbers of deaths dealt with. If we include the small groups of the revaccinated with the much larger totals who were vaccinated only in childhood, and add together the returns for the four years 1923-26, the contrast in age distributions is readily seen in the following table.

Age Group.	Vaccinated Cases.			Unvaccinated Cases.		
	No. of cases.	No. of Deaths.		No. of cases.	No. of Deaths.	
		Actual.	Expected in 1 year.		Actual.	Expected in 1 year.
Under 15	46			10,298	17	
15—	114	1	0.31	2,932	—	7.92
20—	165	—	0 58	1,342	1	4.70
25—	170	—	0.54	824	1	3.16
30—	258	—	1.15	462	—	2.06
35—	394	3	2.12	285	—	1.54
40—	1,301	3	9.82	425	—	3.21
50—	1,204	4	17.88	256	1	3.80
60—	449	—	15.02	78	—	2.61
70—	94	2	7.64	12	1	0.98
80—	5	—	0.94	—	—	—
Total over 15	4,124	13	55.97	6,616	4	29.98

The extraordinary difference between the distributions of ages in these two groups (which can be still more clearly seen by plotting them graphically) provides, perhaps, the strongest presumptive evidence that has as yet been secured of the efficacy of vaccination in protecting against the disease for a period of years, since it is precisely what would be expected if the protection afforded by vaccination in childhood wanes with advancing life. It is, I believe, impossible to explain it in any other way.

If we assume for the moment that small-pox of the prevalent mild type is never fatal in itself, and that these two populations are selected at random from the general population of England and Wales, and subject to the ordinary chances of death at each age group as calculated in English Life Table No. 9 for 1920-22, we can easily estimate the number of deaths which would be expected in each population in the course of a year or a fraction of a year. Confining attention to ages over 15, as Dr. Garrow has done, and assuming the populations to consist of equal numbers of males and females at each age, I have used the mean of the probabilities of dying "q" from the life tables for males and females at the central ages of each of the above age groups, and multiplied these by the numbers in the respective age groups, thus obtaining the numbers of deaths to be expected in one year, as given in the above table. Adding these up, it appears that the expected deaths from all causes in the vaccinated cases over 15 in one year would be 56, and in the unvaccinated over 15 the expected deaths in one year would be 30. It follows that within a period of two months from the onset of small-pox we should expect, from the ordinary chances of death in the population, to have one-sixth of these numbers of deaths occurring—that is, 9 among the vaccinated and 5 among the unvaccinated—and these would be subject in the totals dealt with to probable errors of ±2.0 and ±1.3 respectively, owing to the mere fact of random sampling. This means that we might naturally expect, from pure chance, any number of deaths between 4 and 14 in the vaccinated, and between 2 and 8 in the unvaccinated, to occur within two months of the onset of small-pox. The actual deaths which were attributed to small-pox in the two groups were 13 and 4 respectively, both of which lie within the limits calculated above.

It seems probable that most deaths occurring within two months of the onset of small-pox would be attributed to small-pox as primary cause, and if the recorded deaths do actually represent all the deaths which occurred within that period it may be concluded that the prevalent mild type of small-pox is not really responsible for increasing the chances of death in persons affected to any measurable degree. This has, I think, an interesting bearing upon the final suggestion in Dr. Garrow's letter. However this may be, it can be definitely stated that these figures provide no evidence of any significant difference, either way, between the mortality rates in the vaccinated and unvaccinated cases at ages over 15, though satisfactory evidence has, I think, been previously obtained for the efficacy of vaccination in reducing fatality in the severer forms of the disease, as Dr. Garrow believes.—I am, etc.,

University College, London, Jan. 15th. PERCY STOCKS.

SIR,—Dr. Garrow's inquiry is very easily answered. It is generally known that the immunity conferred by vaccination lasts for a limited time only. The period is variously estimated as between ten and thirteen years. By selecting cases over 15 Dr. Garrow is careful to include all cases vaccinated in infancy, but no longer protected. His statement, that "the fatality rate among vaccinated cases was just five times as great as among unvaccinated cases," is, therefore, grossly misleading.

It is, in my opinion, most regrettable that a medical man occupying a responsible position should broadcast in the medical press such an assertion, which he must be aware will be quoted, on his authority and without context, by the antivaccinist press. This kind of action can do nothing but handicap his colleagues who are engaged in combating the present epidemic of small-pox, with its serious burden on the public funds, the loss of wages involved, and the damage to industry, quite apart from the detriment to public health, which in my recent experience is becoming more serious as the infection is passed through the human medium.—I am, etc.,

January 16th. FRED. E. WYNNE, M.O.H., Sheffield.

SIR,—Dr. Garrow draws attention to the anomalous fact that for the four years 1923-26 the fatality of "small-pox," in the age period "over 15 years," has been five times greater in the vaccinated class than in the unvaccinated, and he invites explanations. I submit that the explanation is as follows:

The figures for "small-pox," which he quotes from the Ministry of Health's report, are: 4,010 vaccinated cases with 13 deaths (=case mortality of 0.32 per cent.) and 6,915 unvaccinated cases with 4 deaths (=case mortality of 0.06 per cent.).

To begin with, the case mortality is so trifling in either group that it at once arouses suspicion of a "catch" somewhere. The "catch" is, that under the term "small-pox" we are including two varieties of the disease so utterly different as regards their case mortality that, for statistical purposes, they are two distinct diseases, and it is most misleading to include them together under the same heading. Indeed, to do so can only lead to a definite *reductio ad absurdum*, and make confusion worse confounded. There should be little practical difficulty in keeping the statistics for the two varieties separate, because I doubt if there has been a single outbreak of small-pox, say in the past ten years, where there was any real doubt as to which variety of small-pox was being dealt with.

If the figures are analysed and sorted out into (1) variola

major and (2) variola minor, we find that we have under (1) an insignificant minority of, say, under a hundred cases of variola major with most of the 13 deaths, and an overwhelming majority of nearly 10,000 cases of variola minor with practically no deaths. The few deaths that have been attributed to variola minor are usually due to some intercurrent complication, and, if these be deducted, we find that variola minor is, for practical purposes, a non-fatal disease in vaccinated and unvaccinated persons alike. As regards the cases and deaths in the small variola major group, it so happens that the few isolated outbreaks which have occurred in the years in question have been among adults rather than among children. But adults in most parts of the country are still, on the whole, a vaccinated class; therefore, it is not very surprising that many of these cases have been in vaccinated persons.

If the statistics for variola major and variola minor were kept separate and distinct, as they certainly ought to be, I have little doubt we should find that in variola major the vaccinated cases would show a definitely lower case mortality than would the unvaccinated cases. But so long as these two varieties of small-pox are "lumped" together the overwhelming majority of non-fatal variola minor cases quite invalidates any fatality rates which may be based on them.—I am, etc.,

Health Offices, Leicester, Jan. 16th. C. KILLICK MILLARD.

SIR,—The letter of Dr. Garrow raises a very interesting question, one of many which have been vexing the minds of those who have watched events in connexion with small-pox and vaccination in recent years. I, in common with all others of our profession, was educated medically in the orthodox fashion: small-pox was a disease which was contracted by unvaccinated persons, and was with them a terrible and fatal malady; in the rare event of a vaccinated person being attacked, the disease was a trifle and of no importance.

Here are a few of the questions in connexion with vaccination which are worrying me. Will any of our members who have studied the subject give me answers?

(1) That raised by Dr. Garrow: How is it that small-pox is five times as likely to be fatal in the vaccinated as in the unvaccinated?

(2) How is it that as the percentage of people vaccinated has steadily fallen (from about 85 in 1870 to about 40 in 1925) the number of people attacked with variola has declined *pari passu* and the case mortality percentage has progressively lessened? The years of least vaccination have been the years of least small-pox and of least mortality.

(3) How is it that in some of our best vaccinated towns—for example, Bombay and Calcutta—small-pox is rife, whilst in some of our worst vaccinated towns, such as Leicester, it is almost unknown?

(4) How is it that something like 80 per cent. of the cases admitted into the Metropolitan Asylums Board small-pox hospitals have been vaccinated, whilst only 20 per cent. have not been vaccinated?

(5) How is it that in Germany, the best vaccinated country in the world, there are more deaths in proportion to the population than in England—for example, in 1919, 28 deaths in England, 707 in Germany; in 1920, 30 deaths in England, 354 in Germany. In Germany in 1919 there were 5,012 cases of small-pox with 707 deaths; in England in 1925 there were 5,363 cases of small-pox with 6 deaths. What is the explanation?

(6) Is it possible to explain the lessened incidence and fatality of small-pox on the same grounds as the lessened incidence and fatality of other infectious fevers—namely, as due to improved hygiene and administrative control?

These are just a few points in connexion with the subject which are puzzling me, and to which I want answers. I am in doubt, and I want to know the truth. Will some of the experts help me?—I am, etc.,

Hove, Jan. 16th. L. A. PARRY.

*** We think that Dr. Parry, in his desire for enlightenment, would have been wiser not to introduce assumptions of fact into the framework of his questions.

ULTRA-VIOLET RAYS AND CATARACT.

SIR,—The controversy on this interesting subject is no doubt intelligible to the writers, but is by no means clear to the reader.

I have no doubt that *undue* exposure to ultra-violet rays will rapidly produce cataract and other serious conditions in the interior of the eye. The following case will explain this issue:

X., aged 35, a Marconi operator at Basra in the great war, came to me with a well developed Morgagnian cataract in one eye and distant vision reduced to 6/9 in the other. He had been frequently examining with the naked eye the sparking apparatus of the generator, which is intense. At first he complained of muscae volitantes and, later, the development of cataract. In the best eye the vitreous had a large number of floating bodies; nothing else was visible. There was no history of noticeable hyperaemia of the conjunctiva.

Assuming, as I do, that the whole condition was due to undue exposure to the ultra-violet rays, it will be seen that it is not merely cataract we have to deal with, but the equally, if not more, profound changes as indicated by the development of the crowd of floating bodies in the vitreous. This case would make me hesitate to use ultra-violet rays in the treatment of any condition of the eye.

As regards the treatment of the early stage of cataract the controversy is not easily understood, because the issues have not been cleared. First, what is the rationale of the action of remedies? Secondly, what is the stage of development submitted to treatment as indicated (*a*) by what can be seen with the ophthalmoscope, and (*b*) by what the patient complains of, and the degree of what he complains, as indicated by the range of his distant vision? If these issues are not clearly stated the controversy cannot be intelligible.

As regards the rationale of treatment (I have done a good deal of work on this subject), if you assume that the satisfactory result is due to the hyperaemia induced and the time it is maintained, no matter by what means it is induced and maintained, and that the rapidity of the result depends on the degree of hyperaemia induced and maintained, in my observation you will be right. Since I wrote my first paper on this subject, close on twenty years ago, all the methods and prescriptions which have come into the field have the same action—namely, the induction of hyperaemia.

I do not agree with the pessimists who hold that nothing can be done for the early stage of cataract. I hold that over 95 per cent. of the cases of senile cataract in the early stage—that is, when distant vision has not been reduced below 6/12—are curable, that the cure is enduring, and that the patient is not submitted to any risks in the process or to much inconvenience; and that this is the greatest triumph in the whole history of the treatment of cataract.—I am, etc.,

Sidcup, Jan. 7th. HENRY SMITH, C.I.E., Lieut.-Colonel, I.M.S.(ret.).

TREATMENT OF PROSTATIC ENLARGEMENT.

SIR,—To those interested in the discussion on prostatectomy the following figures of St. Peter's Hospital may prove instructive:

	Prostatectomy.		
Year.	Cases.	Deaths.	Percentage.
1907	70	4	5.7
1908	63	5	7.9
1909	80	5	6.2
1910	82	8	9.7

In the year 1910 seventy-nine cases were treated by suprapubic prostatectomy and three by perineal prostatectomy. Of the former, five were two-stage operations. I have no details in regard to the preceding years.

The above figures of work done seventeen to twenty years ago are so far ahead of the modern figures for general surgeons, as given by Sir Cuthbert Wallace, that they lend some support to the contention of Sir T. Carey Evans that the expert genito-urinary surgeon is likely to obtain the best results.

There is no doubt in my own mind that those cases where the operation is done quickly do the best. No more mystery is attached to prostatectomy than to any other operation, but a surgeon who performs a given operation frequently should be more expert than the one who performs it occasionally. Again, the actual operation is only part of the story; the pre- and post-operative treatment are of vital importance, and it is by neglect therein that most cases are lost.

A distinguished Scottish general surgeon told me that the